

- 10 -

## CLAIMS

- 1) A magnetic wedge device for application on the fifth wheel of the tractor of articulated vehicles, by means of incorporated permanent magnets, to provide the angular position of the fifth wheel with respect to the axis of a semitrailer to one or more functional systems dependent on this angular position and in particular to the piloting of semitrailer axle steering systems, characterised in that it consists of a wedge-shaped body (10) with a flat upper surface (12) equipped with permanent magnets (13) that maintain the body in contact with the flat surface of the semitrailer, close to the coupling pin (14) of the fifth wheel (11), and two flat side surfaces (15) equipped with permanent magnets (16) that maintain the body in contact with the two inner surfaces (17) of the "V" shaped opening in the fifth wheel in a fully wedged condition and characterised in that it presents a reference or coupling point (P) on which the end of a mechanical, hydraulic, pneumatic or electronic device (D) is applied, providing mechanical, hydraulic, pneumatic or electronic piloting corresponding to the position of the coupling point P on the wedge which is in turn proportional to the angular position of the fifth wheel with respect to the axis of the semitrailer.
- 2) A magnetic wedge device according to the foregoing claim, characterised in that the flat side surfaces (15) are also inclined along the vertical axis by the same draft angle  $\varphi$  as the "V" shaped opening in the fifth wheel (11) which has a narrower "V" on the lower side, further favouring the upper contact of the wedge with the semitrailer.
- 3) A magnetic wedge device according to any of the foregoing claims, characterised in that its detachment from the fifth wheel (11) takes place automatically, thanks to the particular construction of the magnetic wedge, when the tractor is uncoupled from the semitrailer and begins to move, and in this phase, after a few millimetres, the wedge (10) strikes the fifth wheel coupling pin (14), detaches itself from the fifth wheel (11) and remains in contact with the support base of the semitrailer close to the fifth wheel coupling pin (14) due to the presence of the upper

- 11 -

permanent magnets (13).

- 4) A magnetic wedge device according to any of the foregoing claims, characterised in that the attachment of the magnetic wedge (10) to the fifth wheel (11) takes place automatically a few millimetres before fifth wheel (11) of the tractor engages with the pin (14) of the semitrailer thanks to the fact as a result of the previous uncoupling the wedge is close to the fifth wheel coupling pin.
- 5) A magnetic wedge device according to any of the foregoing claims, characterised in that during the rotation of the fifth wheel (11) with respect to the axis of the fifth wheel coupling pin (14) the magnetic wedge (10) follows the rotation while remaining wedged in the "V" shaped opening of the fifth wheel (11) by means of the side permanent magnets (16) and held up by the permanent magnets (13) mounted on the upper surface of the wedge (10) against the support base of the semitrailer on the fifth wheel (11) with very limited friction due to the presence of a considerable amount of grease.
- 6) A magnetic wedge device according to any of the foregoing claims, characterised in that during the rotation ( $\alpha$ ) of the fifth wheel (11) with respect to the axis of the fifth wheel coupling pin (14) the coupling or reference point (P) on the wedge (10) also turns around the pin with a consequent proportional variation of the piloting value.
- 7) A magnetic wedge device according to any of the foregoing claims, characterised in that this coupling or reference point (P), to which the end of a mechanical, hydraulic, pneumatic or electronic device (D) is applied, consists of a hole, a pin or any other type of pivot suitable for any type of coupling.
- 8) A magnetic wedge device according to any of the foregoing claims, characterised in that one end presents an annular flange (18) with a circular opening in its central part, bordered by an annular rim, through which the pin (14) passes, the flange being positioned in a groove (19) around the base (14') of the pin (14).
- 9) A magnetic wedge device according to any of the foregoing claims,

- 12 -

- characterised in that the flange (18) may be equipped with teeth (20) of the "phonic wheel" type suitable for measuring the angular movement between the tractor and the semitrailer detected by means of probes (21) inserted in the fixed base of the pin (14).
- 5. 10) A magnetic wedge device according to any of the foregoing claims, characterised in that the magnetic wedge device (10) comprises, close to at least one of its side surfaces (15), elastic pushing elements (22) that act by holding the other side of the magnetic wedge (10) against the corresponding side of the "V" shaped opening in the fifth wheel (11).
- 10 11) A magnetic wedge device according to any of the foregoing claims, characterised in that each of the elastic pushing elements (22) consists of a hollow cylindrical body (23) housing a spring (24) which acts on a ball (25) pushing it outwards but which is held in its seat by a restricting border (26).
- 15 12) A magnetic wedge device according to any of the foregoing claims, characterised in that its mechanical and magnetic structure is the universal type and allows it to attach itself in a correct and interchangeable position on all the fifth wheels (11) of tractors for articulated vehicles on the market.